

INDUSTRIAL ORGANIZATION



JOHN S. McGEE

F406
M1478



9362413

INDUSTRIAL ORGANIZATION

JOHN S. McGEE

University of Washington



E9362413



Prentice Hall
Englewood Cliffs, New Jersey 07632

Library of Congress Cataloging-in-Publication Data

McGEE, JOHN S.

Industrial organization

p. cm.

Includes index.

ISBN 0-13-464207-4

1. Industrial organization (Economic theory) I. Title.

HD2326.M39 1988

338.6—dc 19

87-32623

Editorial/production supervision
and interior design: Sonia Meyer
Cover design: Wanda Lubelska Design
Manufacturing buyer: Barbara Kelly Kittle



© 1988 by Prentice-Hall, Inc.
A Division of Simon & Schuster
Englewood Cliffs, New Jersey 07632

All rights reserved. No part of this book may be
reproduced, in any form or by any means,
without permission in writing from the publisher.

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

ISBN 0-13-464207-4

Prentice-Hall International (UK) Limited, *London*
Prentice-Hall of Australia Pty. Limited, *Sydney*
Prentice-Hall Canada Inc., *Toronto*
Prentice-Hall Hispanoamericana, S.A., *Mexico*
Prentice-Hall of India Private Limited, *New Delhi*
Prentice-Hall of Japan, Inc., *Tokyo*
Simon & Schuster Asia Pte. Ltd., *Singapore*
Editora Prentice-Hall do Brasil, Ltda., *Rio de Janeiro*

To my mother and
to the memory of my father

PREFACE

In the 1930s, industrial organization emerged as a specialized field in economics. It is not surprising that the field has changed in the many years since it began. What is remarkable is how *much* it has changed. Changes in the last few years, especially, can fairly be called revolutionary. Many of the older theories, facts, and public policy conclusions about industrial organization have been overturned; some others are tottering.

This book integrates and clearly presents the economic theory, empirical evidence, and public policy analyses needed to understand how industrial organization has evolved, and to appraise it as it stands today.

More than other industrial organization books, this one traces the history of the theories and inferences that have proved most important to the field. Knowing where we've come from can help us understand where we are and where we're going. This book is also unusual in explicitly recognizing that institutions matter. Law and liberty are as much a part of civilization as are art, music, and literature. The quality and robustness of civilization, as well as economic efficiency, are profoundly affected by competition and the restraints placed on it. Much of what we call civilization consists of defining and limiting the kinds of competition that are acceptable. These definitions and limits are embodied in constitutions, laws, and culture.

Most people come into economics with a strong interest in public policy,¹ and this book emphasizes public policy issues. In analyzing them, I have hoped to do two things. First, I have worked with law and government regulations for years and want to pass along what I have learned about their substance. Second, I have learned something about analytic tools that can help us understand what institutions and public policies do and—in

¹A fascinating survey demonstrates this, among other things. David Colander and Arjo Klammer, "The Making of an Economist," *The Journal of Economic Perspectives*, 1 (Fall 1987), pp. 95–111.

the interest of helping others reach their own conclusions—have illustrated how to use the tools.

Although it is possible to learn some of the same economics by working problems carefully chosen from price theory texts and workbooks, it is more direct and economical, as well as more interesting, to work on important real problems. Besides, real problems are good for us. Because they can be difficult, real problems teach us respect and humility as we grapple with them.

I have tried to be as direct and clear as possible without sacrificing substance, and have developed the theoretical tools and analyses step by step. Although standard English is by far the most important expository device used here, diagrams and numerical examples also help mark the way at various points. I use a little basic algebra and calculus at a couple of places in the text and in a couple of optional appendices. The appendices are truly optional. You do not need them to understand what is going on; but they are there for anyone who wants to *do* economic studies as well as to understand and evaluate them. As suits their purpose, the appendices are more like demonstration lessons than workbook drills.

Those who believe that public policy and real industrial performance are more important and interesting than pure theory should be pleased to learn that this is not just another price theory book in disguise. It selects theories that are most relevant to appraising economic performance and public policy, treats those theories as a tool kit rather than adornment, and shows how to use the tools. This book does not slight theory, though, and can help those who are interested in theoretical as well as empirical and policy problems.

As we go along, I will point out a number of puzzles and problems that I hope readers will try to solve. If they do, they may decide to do some research on their own, and, more important, begin to look at business and government practices more closely and to ask questions about them.

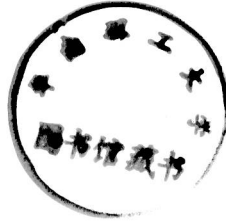
Those who are interested professionally in the kinds of policies and problems this book discusses can pick up the specific economics they need more quickly here than by plowing through unspecialized theory textbooks. Lawyers, consultants, and business executives will find that this book can help in much of what they do.

I have already mentioned some of the unusual features of this book, such as showing how institutions matter and presenting appendices that can help those who want them without imposing on those who do not. There are also some novelties in topics covered, including new material in Chapter 9 about what I call *compound pricing*, and predatory pricing; and in analyzing the problem of externalities, Chapter 17 discusses airport noise, lighthouses and bees, buffalo hunting, commercial fishing, and crude oil production. A short section in Chapter 14 shows how to read and interpret the regression equations that now commonly appear in empirical works on industrial organization.

Seattle, Washington

9362413

CONTENTS



PREFACE xv

1 INTRODUCTION 1

What Is Industrial Organization? 1

The Role of Theory and Scientific Method in Policy Studies 3

The Organization of This Book 4

2 COMPETITION AND EFFICIENCY 7

Introduction 7

Competition in Nature, Games, and War 7

What Do Economic Systems Do? 10

The Model of Atomistic Competition 10

Economic Efficiency 20

The Choice of Constitutions, Rules, and Laws 22

3 CRITICISMS OF ATOMISTIC COMPETITION AS THEORY AND AS POLICY GOAL 39

Introduction	39
Perfect Competition Is Unachievable	40
The Invisible Hand Needs Help	40
Competition May Cost More	45
Dynamic Considerations	48

4 CLASSICAL THEORIES OF OLIGOPOLY AND DOMINANT FIRMS 58

Introduction	58
Classical Theories about the Effects of Numbers	59

5 MODERN OLIGOPOLY MODELS 83

Introduction	83
Chamberlin and Fellner	83
Stigler's Theory of Oligopoly	86
The Problem of Entry, Actual and Potential	88
The Theory of Games	91
Experimental Economics: Games of Theory	95

6 COLLUSION AND CARTELS 102

Introduction	102
The Basic Model: A Cartel of Firms Whose Costs Differ	103
Bid-Rigging Cartels	106

Basing-Point Systems	114
Sales Agencies	122
Buyers' Cartels	124
APPENDIX: MORE GENERAL MONOPSONY MODELS	129
<i>Pure Competition</i> / 130	<i>Monopsony Solutions</i> / 132

7 COSTS AND DEMAND AS DETERMINANTS OF THE NUMBER AND SIZE OF FIRMS 140

Introduction	140
Economies of Size	141
Other Differences Amongst Firms	151
Is Efficiency an Entry Barrier?	152
Capital Requirements	153

8 PATENTS 160

Introduction	160
An Economic Rationale for Patents	160
Economics of Patent Use	162
Case Studies	171
APPENDIX TO CHAPTER 8:	179
<i>Introduction</i> / 179	<i>The Basic Model</i> / 179
<i>Model</i> / 184	<i>A Six-Equation Model with Increasing Costs</i> / 186

9 MONOPOLIZING PRACTICES 197

Introduction	197
Collusion	198
Mergers	198

Predatory Pricing	200
Limit-Pricing Theories	206
All-or-None Pricing and Compound Pricing	212

10 THE THEORY OF PRODUCTS AND MONOPOLY 229

Introduction	229
The Nature of a Product and the Demand for It	229
Monopoly	233
Predisposing Conditions for Monopoly	234
The Limits of Monopoly Power	238
Open and Closed Monopoly	240

11 MEASURING CONCENTRATION AND MONOPOLY 244

Introduction	244
Measuring Concentration	244
Theories about Concentration and Performance	256
Measuring Monopoly Effects	257

12 ECONOMICS OF VERTICAL INTEGRATION 272

Introduction	272
Fixed Proportions in Production	273
Traditional Arguments against Vertical Integration	275

	Efficiencies Claimed for Vertical Integration	280
	Variable Proportions	290
13	WELFARE TRADE-OFFS	304
	Introduction	304
	The Basic Models	304
	Size and Efficiency: Extending the Theory	310
14	EMPIRICAL EVIDENCE ABOUT THE EFFECTS OF INDUSTRY CONCENTRATION	323
	Introduction	323
	An Introduction to Statistical Methods	324
	Statistical Analysis Begins: Joe Bain	328
	Direct Price Comparisons	330
	More Statistical Support for the Structuralist Paradigm	332
	Paradigm Lost?	333
	Economy-Wide Measures of Monopoly or Monopoly Effects	337
15	CONCENTRATION, INVENTION, AND INNOVATION: EMPIRICAL EVIDENCE	351
	Introduction	351
	Theory	352
	The Empirical Problem	353
	Empirical Studies	354

16	ADVERTISING	362
	Introduction	362
	Theories about Advertising	363
	Empirical Evidence	365
17	REGULATING EXTERNALITIES	378
	Introduction	378
	Theories of Regulation and Regulators	379
	Spillovers	382
	Natural Resources: Buffaloes, Fish, and Oil	385
18	REGULATION AT BOTH POLES: PUBLIC UTILITIES AND AGRICULTURE	418
	Introduction	418
	Public Utilities	418
	Agriculture: Regulated Atomism	422
19	INTRODUCTION TO ANTITRUST POLICY	430
	Introduction	430
	Summary of the Antitrust Statutes	431
	Legislative Intent	434
	Some Important Price-Fixing Cases	436
	Disseminating Price Information	441
	Vertical Arrangements	447

Price Discrimination	453
Summary and Conclusions	455

20 ANTITRUST POLICY AND THE LARGE FIRM 461

Introduction	461
The Cases	461
Antitrust Policy and Consumer Welfare	480

INDEX	487
-------	-----

1

INTRODUCTION

WHAT IS INDUSTRIAL ORGANIZATION?

Industrial organization studies how the performance of an industry is related to its structure; that is, to the number and size of firms it contains. How can industry performance and structure be measured or appraised? Concentrated industries are those in which the leading firms do a relatively large share of the business. Do concentrated and unconcentrated industries perform differently? How does the performance of individual firms affect the structure and performance of the industries in which they operate? If there is a substantial causal relationship between performance and structure, does it go both ways, with structure affecting performance and performance affecting structure? And, if industrial performance seems deficient but remediable, which government policies are likely to help more than they cost?

Answering questions such as these is what this book is about.

Systematic study of industrial organization started at Harvard University in the 1930s, during the Great Depression, a time of political and intellectual ferment everywhere. It is hard to pin down why specific schools of thought started where they did. Edward Mason, the Harvard professor of economics who practically fathered the new field, later wrote that the influence of Edward H. Chamberlin had been “profound.”¹ In Mason’s words:

Chamberlin's theoretical insights were developed by his Harvard colleagues in the messier areas of industry statistics, studies of particular firms, and antitrust policy. I had some hand in this along with younger colleagues and graduate students of whom Donald H. Wallace and Joe S. Bain deserve particular mention. . . . we had some hope of developing an operational classification of market structures that would not only go far toward explaining the behavior of firms but also provide normative standards of performance of use to antitrust policy. Although this goal was never reached, a substantial contribution, I believe, was made in shaping the field of industrial organization.²

The last two sentences of this quotation refer modestly to one of the things for which Professor Mason and Joe Bain are famous. It came to be known as the Structure-Conduct-Performance Paradigm, which dominated the field of industrial organization for many years and is still popular.

In the beginning, most economists seem to have believed that the structure-conduct-performance relationship was largely or altogether one way: to a significant degree the *structure* of an industry determines the *conduct* of firms in it; and how firms behave to a significant degree determines how well the industry *performs*. The major hypothesis was that a highly concentrated industry—one with a few large firms—was more prone to collude or act as though it had, resulting in high prices, high profits, and perhaps laggard technological innovation and other deficiencies as well.³

Naturally enough, different writers used somewhat different ingredients in their versions of the same basic model. In some versions, for example, structure included concentration on both the seller side and buyer side of markets; the degree of vertical integration; product characteristics, including whether the goods are durable or nondurable, principally used by consumers or producers; and whether entry is easy, hard, or “blockaded.” Behavior, or conduct, included such things as advertising, product differentiation, price discrimination, predatory and exclusionary tactics, collusion, and quasi-independent price determination. Performance included production efficiency, optimum sizes of firms and how fully economies of size had been realized, excess capacity, margins between price and cost, profits, price flexibility, and “excessive” advertising and other selling costs.

Many studies of specific industries—so-called industry studies—used this paradigm to judge whether specific industries were effectively competitive, or needed government intervention to improve their performance.⁴

Like most theories, the structure-conduct-performance paradigm proved to have problems. One was that industrial structure did not seem to determine performance as reliably or in quite the same way as had been theorized. A related problem was that causality, if any, might run in the opposite direction: the superior performance of some firms could lead them to grow large, creating the very concentration that the earlier paradigm led us to fear. In this case, however, concentration would lead to, or would have been produced by and symptomize, superior performance in such industries. Or perhaps, overall, causality ran in both directions; or sometimes one way and sometimes another.

Information about such relationships, and confidence in them, changed greatly over the years, as we will see in subsequent chapters.

THE ROLE OF THEORY AND SCIENTIFIC METHOD IN POLICY STUDIES

Industrial organization might conceivably have developed as a purely scientific field, avoiding normative conclusions and policy proposals altogether. If it had, it would have used theory to collect and organize information about real firms and industries, tested and modified the theory to explain new facts as they came along, and let it go at that. Such an approach is not trivial: it helps explain how the world works and why it works that way—a major accomplishment. Nor is scientific method brutal. It need not crush out compassion or force conformity. As physical science and medicine show, scientific method probably will never eliminate disagreement about even “the facts,” which change over time. And important differences in values and goals will surely remain, more perhaps in some fields than in others.

Pure theory and pure science are not enough to satisfy everyone: many want at least as much to improve the world as to understand it. Most who major in economics came to that field largely because they are interested in public policy.⁵ Many of even the best economists were attracted to economics because they hoped to do good. Alfred Marshall, the great English economist, is an illustrious example of one who retained his interest in understanding and combating poverty.⁶ In industrial organization, as in other fields of economics, scholars have seldom hesitated to make policy proposals, even when their theories and facts were weak.

For several reasons, industrial organization tends to be even more policy oriented and controversial than some other fields. It attracts those who are interested in policy and who like policy debates, then teaches them skills useful in controversies that pay well. Antitrust laws and other regulations employ industrial organization economists in business, government, and courtrooms.

Economic theories and quantitative analyses offer precise answers to some public policy questions. It is dangerous, however, to worship precise answers for their own sake. First, it is clearly better to be approximately correct than precisely wrong.⁷ And, as John von Neumann, a world-famous mathematician, is supposed to have said, it makes no sense to be precise about something when you do not even know what you are talking about.

Second, one reason to ask what any theory covers is that cold arithmetic tends to drive out values that are difficult to measure. But we must also be leery of analyses that depend crucially upon the unmeasurable or upon an analyst's personal values. For one thing, charlatans have a field day when we permit them to be vague. Diviners want to be able to take any side of all questions and hate to be bound by logic, consistency, or empirical tests. They relish the freedom to sound judicial and wise, and to treat each case as a unique phenomenon.

Third, precise quantitative answers sometimes come from analyses more complicated and demanding than our data and understanding can support. When data are poor, analysis that is hypersensitive to what we feed it can drag us far off track. And, as Alfred Marshall warned, long chains of reasoning and reckoning can go wildly wrong even when

our intentions are good. On top of that, complexity can be used purposefully to obscure a trail and confuse the hounds.

Dangerous though bad theory is, there is no substitute for what good theory can do. No finite human mind can cope with all the facts; facts do not speak clearly for themselves. Theory helps organize the facts we have and directs the search for others not yet in view. Clear, explicit theory can improve communication by showing what is at issue and by keeping us talking to one another about the same things, one at a time. Since tractable theory must simplify, however, it can never be completely realistic. As Milton Friedman put it:

A hypothesis is important if it “explains” much by little, that is, if it abstracts the common and crucial elements from the mass of complex and detailed circumstances surrounding the phenomena to be explained and permits valid predictions on the basis of them alone. . . . the relevant question to ask about the “assumptions” of a theory is not whether they are descriptively “realistic,” for they never are, but whether they are sufficiently good approximations for the purpose at hand.⁸

Joan Robinson, by contrast, claimed that the assumptions of a theory should be realistic enough to communicate and keep a decent reputation with “the practical man,” if for no other reason. When answering a question, she said, the economist should:

. . . make clear what assumptions about the nature of the problem are implicit in his answer. If those assumptions are near enough to the actual conditions to make the answer serviceable the practical man can accept it, but if the assumptions are very abstract the economist will only bring the practical man into confusion and himself into disrepute by allowing him to suppose that the question which is being answered is the same as the question which is being asked.⁹

It is often hard to decide which of competing theories is most consistent with the facts. And sometimes even the best theory does not explain or predict very well. Chapters 14 to 20 discuss these problems.¹⁰

THE ORGANIZATION OF THIS BOOK

This book provides what we need to answer the central questions of industrial organization and to evaluate studies such as those Professor Mason mentioned in his historical summary. The industrial organization economics developed here has three major themes: theory, measurement, and policy.

Much of this book is about resource allocation in a market system. Earlier chapters lay necessary theoretical foundations. Chapter 2 discusses competition in nature, war, and games; outlines functions performed by all economic systems, from individual households on up; defines efficiency; and presents the traditional and still popular theory that the efficiency of resource allocation depends upon whether industry is competitive or monopolistic. It also discusses institutions and how to appraise them.